

AD-A139 751

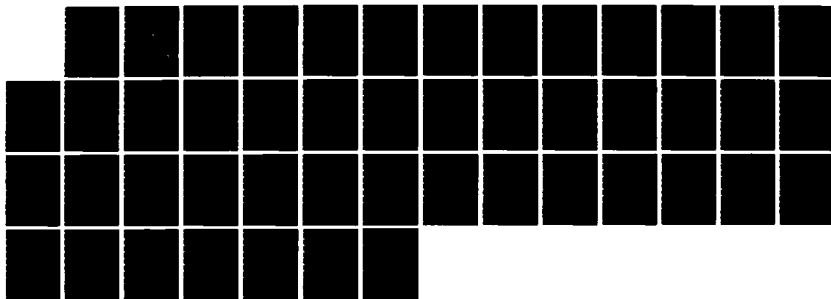
AN ANALYSIS OF BUDGETING IN FOUR INDUSTRIES(U) NAVAL
POSTGRADUATE SCHOOL MONTEREY CA M S ROESNER DEC 83

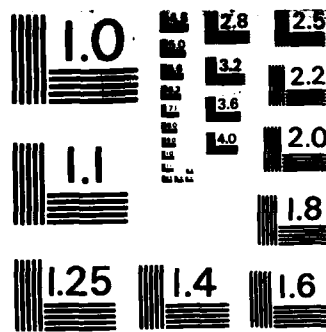
1/1

UNCLASSIFIED

F/G 5/1

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

2

AD A139751

NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

AN ANALYSIS OF BUDGETING IN FOUR INDUSTRIES

by

Michael S. Roesner

December 1983

Thesis Advisor:

M. S. Perret

Approved for public release; distribution unlimited.

DTIC
ELECTE
APR 05 1984

E

DTIC FILE COPY

84 04 03 052

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

DD FORM 1 JAN 73 1473

UNCLASSIFIED
1 SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

#20 - ABSTRACT - (CONTINUED)

that there are no differences in the budgetary processes of high and low-performing companies within the same industry,

A profile describing the overall organizational and budgetary characteristics of each industry was constructed using data acquired from interviews with corporate executives. Profit-center or major divisional executives also provided data through surveys on the behavioral aspects of the budgetary process in each industry,

Discriminant and variance analysis techniques showed that there were differences across the industries, and between the high and low-performers within an industry.

Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	



UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Approved for public release; distribution unlimited.

An Analysis Of Budgeting In Four Industries

by

Michael S. Roesner
Lieutenant, Supply Corps, United States Navy
B.S., Northern Michigan University, 1974

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1983

Author:

Michael S. Roesner

Approved by:

Thesis Advisor

Joseph E. San Miguel

Second Reader

Richard L. Elton

Chairman, Department Of Administrative Science

K. T. Marshall

Dean of Information and Policy Sciences

ABSTRACT

This research tested some aspects of the contingency model of management, specifically whether firms in the apparel, wood, chemical and aerospace industries adapted their budgetary processes to the nature of their respective environments. The hypotheses were that there are no differences in the budgetary processes of companies operating in different industries, and that there are no differences in the budgetary processes of high and low-performing companies within the same industry.

A profile describing the overall organizational and budgetary characteristics of each industry was constructed using data acquired from interviews with corporate executives. Profit-center or major divisional executives also provided data through surveys on the behavioral aspects of the budgetary process in each industry.

Discriminant and variance analysis techniques showed that there were differences across the industries, and between the high and low-performers within an industry.

TABLE OF CONTENTS

I.	INTRODUCTION	7
	A. OVERVIEW	7
	B. BACKGROUND	8
II.	THE PRESENT STUDY	10
	A. PURPOSE	10
	B. HYPOTHESES	10
	C. THE VARIABLES	10
	1. The Environment	10
	2. The Characteristics Of The Budgetary Process	13
	D. PERFORMANCE	14
	E. SIZE	15
III.	RESEARCH STRATEGY	16
IV.	ANALYSIS	18
	A. PROFILES	18
	1. The Apparel Industry	18
	2. The Wood Industry	19
	3. The Chemical Industry	20
	4. The Aerospace Industry	21
	B. ANALYSIS OF THE BEHAVIORAL QUESTIONNAIRE . . .	23
	C. HYPOTHESIS TESTING	23
	D. THE ANALYSES OF VARIANCES	25
V.	CONCLUSIONS	27
	APPENDIX A:	31
	APPENDIX B:	33

APPENDIX C:	34
APPENDIX D:	36
APPENDIX E:	38
APPENDIX F:	40
APPENDIX G:	42
LIST OF REFERENCES	44
INITIAL DISTRIBUTION LIST	45

I. INTRODUCTION

A. OVERVIEW

The "Contingency Theory" of management states that the performance of an organization is a function of the degree of "fit" between the characteristics of its environment and those of its management systems, Lawrence and Lorsch [Ref. 1], Burns and Stalker [Ref. 2], Woodward [Ref. 3]. Therefore, organizations operating in different environments ought to approach decision making (and in particular budgeting) differently, these differences being related to those between their respective environments. There is a paucity of empirical information on how organizations actually adapt their budgeting activities to their environments. The purpose of this research is to explore the nature of the adaptations of budgeting systems to the different environments in firms taken from four different industries: (aerospace, wood and paper products, chemical, and apparel). More specifically, this study will:

1. Compare and contrast the budgetary processes employed by firms in one industry, with those used in the three other industries.
2. Examine whether or not the "high-performers" in an industry have budgetary processes that more closely "fit" their environment.

Hopefully the research findings will assist managers of organizations to evaluate their own budgetary systems in view of the techniques employed in their industry.

B. BACKGROUND

The works of Burns and Stalker, Woodward, and Lawrence and Lorsch, suggest that different external technical and economic conditions require different organizational systems. Burns and Stalker [Ref. 4], point out that organizations in more stable industries tend to be more "mechanistic", their management being characterized by more reliance on formal rules and procedures, decisions reached at higher levels, and narrower managerial spans of control. Conversely, organizations operating in more dynamic industries tend to be more "organic", characterized by wider spans of supervisory control, less reliance upon formal procedures, and emphasis on decision making at the middle levels of the organization.

Budgeting is a key management tool for any organization, regardless of its environment. If the contingency theory is valid, then one should find differences in the budgeting systems of firms operating in different environments where different technical and economic conditions prevail. Furthermore, the "successful" organizations, (meaning the "high-performers"), in one type of environment should show strong similarities in the design of their budgeting systems, as the "fit" between the budgeting system and the characteristics of the environment is a necessary condition for high-performance in the contingency model. Conversely, it is hypothesized that the low-performers will have more diversity in their budgeting systems as the "fit" with the environment will not necessarily be present.

Merchant [Ref. 5], recognized that few empirical research studies had been conducted in accounting to operationalize the contingency model of management. He conducted an empirical research to test the hypothesis that organizational performance is higher where there is a "fit" between the corporate context, or internal environment,

and the design and operation of the budgeting system. He defined the internal environment of the organization as the size, diversity, and degree of decentralization and sought to determine the effects of these variables on corporate budgeting processes and practices in the electronics industry. Merchant's findings were that performance, measured by individual self-ratings, was higher for organizations where the type of budgetary strategy adopted (administrative versus interpersonal) conformed to the size and diversity of the company. This study uses instruments adapted from Merchant to measure the characteristics of the budgetary processes. However, it seeks to isolate the effect of the external environment on the organization's budgetary processes rather than that of internal environmental variables. For this purpose, four industries have been selected each characterized by different technological and economic conditions.

II. THE PRESENT STUDY

A. PURPOSE

The purpose of this research is to examine the characteristics of the budgetary processes employed by firms in four industries, and to study the effects of the external environment on those processes.

B. HYPOTHESES

In their null form the hypothesis tested in this research are the following:

1. There are no differences in the budgetary processes of firms operating in different industries.
2. There are no differences in the budgetary processes of high and low-performing firms within the same industry.

C. THE VARIABLES

This study examines the effect of the independant variable, "the envircnment", upon two dependant variables: the characteristics of a firm's budgetary process, and it's performance. These three variables are operationalized successively:

1. The Environment

This research uses Duncan's model to define and classify relevant types of environments. Duncan described

the environment as the totality of the physical and social factors that are taken into consideration in the organization. He further differentiated between the system's internal and external environment:

The internal environment consists of those relevant physical and social factors within the boundaries of the organization or specific decision unit that are taken directly into consideration in the decision-making behavior of individuals in that system. The external environment consists of those relevant physical and social factors outside the boundaries of the organization or specific decision unit that are taken directly into consideration [Ref. 6]

Duncan identified a number of components, or major divisions of an environment, and for each component he further identified a number of factors. The list of components and factors is reproduced in Appendix A.

Duncan inferred from the previous work of organizational theorists that two environmental dimensions existed: the simple-complex dimension and the static-dynamic dimension. An environment is classified as simple if the factors in the decision unit's environment are few in number and are similar to one another in that they are located in a few components. It is classified as complex if the factors in the decision unit's environment are large in number (ibid). The other dimension of the environment, static-dynamic, indicates the degree to which the factors of the decision units internal and external environment remain historically unchanged (static), or are in a continual process of change (dynamic). The static-dynamic dimension consists of two sub-dimensions. The first considers the degree to which factors in the internal/external environment remain unchanged over time, or continue to change. The second focuses on the frequency with which new and different factors must be considered by individuals in the decision making process.

Duncan's conceptualization of the environment is expressed in Appendix B. Combining the two dimensions produced four cells, each cell representing a type of environment characterized by its level of complexity and its changeability. The four cells, therefore, represent an increasing degree of perceived uncertainty for the individual decision makers, cell one (simple/static) representing the lowest level, and cell four (complex/dynamic) the highest level of uncertainty.

Four industries were chosen for this research, each having an environment corresponding to one of Duncan's cells. The selection of the industries was based on the opinions of several experts in the fields of corporate finance, economics, and management. The apparel manufacturing industry was selected to represent cell number one, typified by relatively few factors and components in the environment, that are somewhat similar to each other, and which remain constant over time.

Cell two, characterized by a large number of factors and components in the environment that are relatively dissimilar yet basically constant, is represented by the wood, paper and paper products industry. Companies in this industry must consider a wide variety of factors such as: demand fluctuations precipitated by construction trends, environmental impacts, the effects of weather on its sources of supply, the effects of pests/parasites, government regulation on wood cutting, etc. These factors bear little similarity to one another and have been historically relevant factors in this industry.

Cell three, represented by the chemical industry, has an environment typified by a small number of factors and components, somewhat similar to each other, but subject to considerable change. The rapidly expanding technology of

today's society has made it imperative that chemical manufacturers constantly change internally in order to supply those products demanded by their markets.

The fourth and final cell is the most dynamic, and exemplifies an environment with a large number of factors and components. The factors and components are not similar to each other, and are continually changing. The aerospace industry was selected to represent this environmental cell. Firms in this industry must consider a very large number of factors, often very dissimilar, such as raw materials scarcity, uncertain demand, labor shortages/disputes, economic uncertainties, etc. Furthermore, the aerospace industry is at the forefront of technology, is the most dynamic of the four environments.

2. The Characteristics Of The Budgetary Process

The characteristics of the budgetary processes were broken down into a "mechanics" component which identifies the formal design of the budgetary system, and a "behavioral" component which identifies the behavior, motivations, and the attitudes of the decision makers within an organization toward the budgetary process.

The "mechanics" questionnaire looks at the existence of formal long-range and short-range financial plans, and at their formulation and approval processes. It covers:

1. structures of the organizations
2. the degree of centralization in decision-making
3. the horizons of the long and short range financial plans
4. the updating of the plans
5. the detail of the plans
6. the input, approval, and implementation process
7. the variances computed
8. the data processing system

9. the use of computer generated models or simulations
10. the use of flexible or zero-based budgeting techniques

The first part of the "behavioral" questionnaire used by Merchant was an abbreviated version of the Swieringa and Moncur questionnaire [Ref. 7].

Merchant performed a factor analysis on his data which identified six factors. For this research, the highest loading variables in each of Merchant's factors were retained, in total eighteen of the thirty-seven items in Merchant's survey were used. Merchant's factors and highest loading variables are presented in Appendix C.

In addition to this questionnaire, the four other instruments used by Merchant were retained for this research, ie.

1. a five-item scale measuring the usefulness of budgeting, developed by Swieringa and Moncur (ibid), and Bruns and Waterhouse [Ref. 8],
2. the three-item Hackman and Porter scale measuring motivation and attitudes [Ref. 9],
3. a seven-item Hackman and Porter (ibid), scale measuring the link between budget performance and the corporate reward system
4. a series of questions dealing with slack and manipulation in the budgetary process

The complete "behavioral" questionnaire is therefore essentially that used by Merchant, but reduced in length where possible.

D. PERFORMANCE

The specific firms chosen to represent each industry were selected from Fortune Magazine's list of the five-hundred largest and five hundred second largest industrial

corporations in the United States. These companies are ranked by gross revenues. The sample included all the companies in each of the selected industries which appeared for the last three consecutive years in either of the lists. This technique yielded a sample that contained twenty-eight companies in the apparel industry, fifty-two companies in the wood industry, sixty companies in the chemical industry, and nineteen companies in the aerospace industry. The only exception to this procedure occurred in the aerospace industry. This group constituted the smallest portion of the sample. In order to increase the potential data collected, an additional firm was included with gross revenue just under the cut-off for inclusion in the Fortune's lists.

Return on sales, and change in sales were selected as performance criteria, using data for the three most recent years. Return on sales, and change in sales rates for each firm were compared against the industry medians published by Fortune. Any company whose calculated rates were higher than the industry median in both categories for all three years was considered to be a "high-performer". The remainder of the companies were considered to be "low-performers" for the purposes of this research.

E. SIZE

In order to account for the effect that size may have on the budgetary processes, the selected firms were classified as either "small" or "large" within each industry. The criterion for this classification was the particular list that a firm appeared on. If it was on the largest five-hundred list for at least one year out of the three examined, then it was considered to be a "large" company. If, on the other hand, the company never appeared on the largest list, then it was considered "small" for purposes of this study.

III. RESEARCH STRATEGY

The strategy for collecting the data combined the usage of personal interviews, telephone interviews, and mailed survey questionnaires. Each firm in the sample was mailed a letter introducing the project and soliciting participation. These letters were addressed to the Chief Financial Officer, or commensurate corporate level manager. A telephone call was then made to the addressee to determine each company's willingness to participate, and the degree of participation that could be expected. Each firm was asked to provide an interview with a manager who could describe the mechanics of the budgetary system in the organization. These interviews were, for the most part, conducted with a corporate level executive, usually the Chief Financial Officer, Controller, or planning manager. Most of the companies agreed to the telephone interviews, and an audio tape recording of each was made. A few companies requested that their input be via the written format, and one corporate official was interviewed in person. The chief financial officer, or person granting the "mechanics" interviews was asked to provide the names and addresses of at least fifteen of the lowest level profit-center managers in the company for participation in the behavioral part of the survey. If the company did not have profit centers, or was reluctant to grant permission to survey its profit-center managers, then major cost-center managers were substituted. Approximately ninety percent of the respondents were profit-center managers. Generally, the profit-center managers were division managers. Five companies in the apparel industry, six in the wood industry, fourteen in the chemical industry, and ten in the aerospace industry participated in the "mechanics" interviews.

However, as can be seen below, not all of these companies agreed to participate in the "behavioral" survey.

The managers identified for the "behavioral" survey were sent individual packets containing instructions for completing and returning the survey. As planned, the majority of responses were received directly from the manager being surveyed. In total, two-hundred and thirty-six participants were provided. A break-down of the "behavioral" participants by industry follows:

1. apparel: four companies provided fifty-eight participants
2. wood: five companies provided forty-six participants
3. chemical: ten companies provided eighty participants
4. aerospace: seven companies provided fifty-two participants

One-hundred and eighty of the questionnaires were completed and returned in time to be incorporated in the analysis presented in this thesis, for a net participation rate of seventy-six percent. A break-down of "behavioral" respondents by industry follows:

1. apparel: thirty-seven responses
2. wood: thirty responses
3. chemical: sixty-seven responses
4. aerospace: forty-six responses

IV. ANALYSIS

The analysis for this research has been broken down into two areas. The first is a descriptive profile of the sampled firms in each of the four industries prepared from the "mechanics" interviews. The second area is a statistical analysis of the "behavioral" data.

A. PROFILES

1. The Apparel Industry

Five firms from the apparel industry participated in the "mechanics" portion of the research. They were organized mainly along product lines with the exception of one company that was organized functionally. Decision-making was more centralized in this industry than in any of the other three industries.

The majority of the firms had profit centers within their organizations. Three of the five companies had formal long-range financial plans with horizons ranging from three to five years. These long-range plans were prepared and updated on an annual basis. All of the companies had annual budgets that contained detailed information broken down to the cost-center level. The annual budgets were prepared for monthly, or monthly and quarterly increments. The three firms that had formal long-range financial plans updated their annual budgets on either a quarterly or yearly basis. The two firms that had no formal long-range financial plans, did not update their annual budgets. All five firms did extensive variance analysis.

The three companies that had formal long-range financial plans also had a corporate budgeting or planning

manual, or were in the process of developing one for immediate use. The two firms that had no formal long-range plan had no corporate planning or budgeting manual, and issued little or no guidelines and assumptions for the preparation of the budget. The other three firms issued extensive guidelines and assumptions regarding the economy, inflation, labor rates, materials costs, overhead costs etc.

There was a wide variety of responses concerning the actual budget formulation and approval process, and there was no observable pattern for the usage of: flexible or zero-based budgeting, or computerized models or simulations. Those companies that had formal long-range financial plans tended to make greater usage of data processing assistance in the budgetary process.

Two of the three firms with long-range plans were high performers, and one was both a high performer and a large company. Both of the companies without long-range plans were small firms, and neither was a high performer.

2. The Wood Industry

Six firms from the wood industry participated in the "mechanics" research. The sample contained four large firms, two of which were high performers. Of the two small firms one was a high performer. The companies tended to be more decentralized than those in the apparel industry, with no clear organizational structural patterns for the sample as a whole. All of the companies had formal long-range financial plans with horizons that ranged from three to fifteen years. These plans were prepared on a yearly basis and were all updated at least annually. All the firms in the sample had annual budgets that were broken down for entities below the corporate level, (as far as cost-centers within factories). The annual budgets were generally broken down on a monthly basis and were all updated within the budget year

except for one company. There appeared to be significant emphasis placed upon variance analysis by all the companies in the sample. Two of the firms had a corporate budgeting or planning manual and these firms also issued guidelines and assumptions to their managers that prepared formal budget inputs. The other firms issued no guidelines or assumptions. There was no evident pattern relative to the usage of flexible or zero-based budgeting techniques. Most firms did not use computer generated models or simulations.

All of the firms made use of data processing in the budgetary process, but only two had remote interactive terminals available. The formulation and approval process appeared to be bottom-up, with many iterations and reviews before the final approval by corporate management.

3. The Chemical Industry

The sample for the chemical industry contained fourteen companies. Nine were large. Five large and two small companies were high performers. The corporate structures varied greatly (many of the firms were highly diversified, two of them derived less than fifty percent of their revenues from chemical related activities). There appeared to be more centralized decision-making in this industry however, than in the wood industry. Virtually all of the companies had profit centers within the organization. All of the companies, except for one, had a long-range formal financial plan with horizons of three to five years. Most were prepared on an annual basis. All the firms had annual budgets broken down for entities below the corporate level, for the majority down to the cost-center level. The annual budgets were broken down on either a monthly or a quarterly basis, or a combination of the two. All were updated at some time during the fiscal year. The majority of the companies had a corporate budgeting or planning manual, and provided

guidelines and assumptions to managers preparing the budget inputs. The guidelines and assumptions concerned economic, labor, overhead, and other industry-related data. Only two firms provided profitability constraints or profit targets. Extensive variance analysis was performed by every firm in this industry.

The formulation process typically contained many iterations. Final approval usually rested with top level corporate management. Very little use was made of flexible or zero-based budgeting techniques. All of the firms made extensive use of computers in the budgetary process. Most used both interactive and batch facilities. The majority of companies had computerized models or simulations available, and used them for budget related activities.

4. The Aerospace Industry

Ten companies from the aerospace industry participated in the "mechanics" portion of the research. Seven of the companies had profit centers within their organizations. Most of the companies were organized into product or product-group segments. The sample contained four companies that derived less than fifty percent of their revenues from the aerospace industry. Of the large companies, three were high performers. Two of the small companies were high performers.

All of the companies had formal long-range financial plans. Most were prepared annually and broken down by years, however two companies used quarterly or monthly and quarterly intervals for preparing the long-range plan. One of the companies used a multiple year increment for preparing its formal long-range financial plan. The long-range plans had horizons that varied from two to ten years. All were updated on an annual or more frequent basis. The long-range plans for this industry contained the most detail, and

extended farther (on average) than any of the other three industries in the study.

All of the companies had very detailed annual plans, broken out for cost-centers, except for one firm that did not identify formal budget information below the divisional level. All of the high performers updated their annual budgets at sometime during its cycle. Most were updated on a quarterly or monthly basis. Two of the low performers did not update their annual budgets.

No pattern could be detected for the use of planning manuals. Approximately half the companies did not use them. Virtually all of the companies issued guidelines and assumptions to managers preparing budget inputs. Variance analysis was used extensively by all of the companies.

Much of the budget formulation and revision process was based on contracts that had been awarded to the company. Manufacturing, tooling, labor, material, and engineering costs were identified as a result of the contract bid and estimation process, and then incorporated into the budgets. Overhead was sometimes considered in a separate budget. Corporate level involvement for the large, high performing companies was generally limited to a review of summary data. Corporate level action to revise these budgets appeared to be limited to an "on exception basis", rather than as a matter of standard operating procedure. Nine of the companies had extensive electronic data processing assets available for use in the budgetary process. The same nine had computer generated models and simulations available. No pattern could be detected for the use of either flexible, or zero-based techniques. This industry demonstrated more decentralized decision-making than any of the other three industries.

B. ANALYSIS OF THE BEHAVIORAL QUESTIONNAIRE

The factor analysis of the "behavioral" data resulted in twelve factors which closely matched the scales used to make up the "behavioral" questionnaire. The first eighteen variables loaded on six factors that accounted for sixty-five percent, and the remaining variables loaded on six factors that accounted for fifty-eight percent of the total variance in the responses. For the first eighteen items taken from Merchant's factor analysis of the Swieringa and Moncur questionnaire, the main difference between this factor analysis and that of Merchant's was in the ranking of the factors rather than in their structure. In fact, only two items out of eighteen were classified differently. The significance of this observation cannot be overlooked for it implies that those factors that were significant to describe the budgetary behavior in the electronics industry (which was the object of Merchant's research) are also significant to describe the budgeting behavior of managers in four other industries. Appendix D. and E. list the factors, and highest loading variables resulting from the factor analysis. The cut-off point chosen to include a variable within a factor was a loading of .40.

C. HYPOTHESIS TESTING

As described in Chapter II, two hypotheses were tested in this research, which expressed in their null form were the following:

1. There are no differences in the budgetary processes of firms operating in different industries.

2. There are no differences in the budgetary processes of high and low performing firms within the same industry.

In order to test each hypothesis, two discriminant analyses were conducted, the first one to determine whether there were differences in the responses between industries, and the second one to determine whether there were differences between the high and low-performers within an industry.

In all cases the results of the discriminant analysis showed that both hypotheses must be rejected. For the analysis between industries, the percentage of cases correctly classified was ninety-five percent on the first eighteen items, and ninety-one percent on the other four scales for the apparel industry. For the wood industry, the percentages were respectively ninety-five and one hundred; for the chemical industry they were eighty-nine percent and ninety-five percent and for the aerospace industry, eighty-five percent and eighty-nine percent. These percentages indicate a clear difference between the four industries on both parts of the questionnaire.

The discriminant analysis of high and low-performing companies within an industry showed similar results. For the first eighteen questions, Ninety-two percent of the high-performing companies in the apparel industry were correctly classified, as were ninety-one percent of the low performing companies. Ninety-six percent of the high-performing, and eighty two percent of the low performing apparel companies were correctly classified for the remainder of the "behavioral" questionnaire. In the wood industry only sixty-three percent of the high-performing companies were correctly classified regarding the first eighteen items, however ninety-one percent of the low-performing companies were correctly classified for the same questions. One hundred percent of the high and low performing companies in the wood

industry were correctly classified for the other items of the "behavioral" questionnaire. One hundred percent of the high and low-performing companies in the chemical industry were correctly classified for the first eighteen questions, and the percentage of correct classifications for both the high and low performers for the remaining items was eighty-one percent. In the aerospace industry, one hundred percent of the high and low-performing companies were correctly classified for the first eighteen items, and eighty-one percent of the high-performing and ninety-five percent of the low-performing companies were correctly classified for the remaining items.

These data demonstrate that there are clear differences between high-performing and low-performing companies within each of the four industries. In order to examine more closely the differences and their nature, analyses of variances were conducted on the factors across the industries.

D. THE ANALYSES OF VARIANCES

The purpose of this research was to test some aspects of the contingency model of management, specifically whether, and how, firms operating in different economic and technical environments adapted their budgeting processes to the nature of their respective environments. In order to learn the nature of the differences between industries, analyses of variances were conducted on each of the factors, and on each of the variables within a factor. Results showed that on every factor, except for one, there were statistically significant differences between the industries. There were also statistically significant differences in twenty-three of the forty-three individual variables that were tested. Appendix F. and G. illustrate the factors and the variables that were tested for differences between industries, along

with the F values and probabilities of exceeding F for the variables that had statistically different values across industries. Each industry's mean response is also presented in order to demonstrate the direction of responses in an industry. Further research into the differences between the high and low-performing companies within an industry, is highly recommended.

V. CONCLUSIONS

The four industries differed significantly in the level of decentralization of the budgetary process and the significance attached to performance against the budget.

The apparel industry is described first as it stands out clearly from the other three industries. This industry was the most centralized of the three and attached the most importance to achieving the budget targets. The profit center managers reported a high involvement with details when budgeting, reporting, and explaining variances. Given the high hierarchical level of the respondents, these answers suggest a very centralized process. Furthermore, they also assigned the highest scores of the four industries when answering the questions regarding their top management's attention to details and ability to identify slack in the budget. Finally, they reported the least ability to manipulate their budgetary data in order to retain some safety margin for themselves. The answers are consistent with the answers to the questions dealing with the decentralization of decision-making which were included in the "mechanics" questionnaire, and which indicated that the apparel industry was, formally, the most centralized of the four industries.

The budget in the apparel industry appeared to be an important tool which received a great deal of emphasis. The profit center managers reported the strongest link of the four industries between the budget performance and the corporate reward system. They agreed that performance against the budget was an important factor for career advancement, and they also reported the highest sense of personal satisfaction and feeling of accomplishment in connection with achieving the budget.

The profiles for the other three industries were more difficult to sketch out as they were more "middle of the road". Patterns for the industries in Duncan's two middle cells, the wood and paper and the chemical industry, were especially hard to detect. The budgetary process was significantly less centralized, however, than in the apparel industry. The profit-center managers reported significantly less involvement with details, the frequency of involvement being expressed by the answers "occasionally" to "often", as opposed to "always" to "often" in the apparel industry. They also viewed their top managements as less involved with details and the issue of budgetary slack. Finally, the link between budget performance and career advancement was not as strongly expressed as in the apparel industry. Personal satisfaction in connection with achieving the budget, although clearly expressed, was not as strongly expressed as in the apparel industry.

The industry in Duncan's fourth cell, the aerospace industry, was either similar to the wood and chemical industries, or to the apparel industry. In only two instances, was the aerospace industry markedly different from the other three. The profit-center managers reported going to their superiors for advice on how to achieve their budgets considerably more often than those in the other three industries. The aerospace managers scored "often", versus a response of "occasionally" in the other industries. They also reported the highest need to protect themselves by submitting budgets that can be safely attained.

On a number of dimensions, the aerospace industry's scores were either close to those of the apparel industry, or in between those of the apparel, and those of the wood and the chemical industries. The requirements for explaining the variances and reporting on the corrective actions taken were similar to those in the apparel industry. Like the

apparel industry managers, the aerospace industry managers also expressed a high feeling of accomplishment and personal satisfaction when achieving the budget. On all the other dimensions, the aerospace industry strongly resembled the chemical and wood industries.

The nature of the differences described between the apparel and the other three industries is consistent with the differences in their environments. The apparel industry represents Duncan's cell one, that is the environment with the lowest level of perceived uncertainty. The type of control system that best "fits" this environment is one where decision-making is centralized, and budgetary control tightly implemented, (two characteristics which were observed for the apparel industry).

Findings for the aerospace industry, Duncan's cell four, representing the environment with the highest level of uncertainty, however, were not as dramatically different from the other industries as one might have expected. On two items it differed markedly from the other three industries and these differences were consistent with an uncertain environment. First, the managers reported more interactions with their superiors, which is consistent with Lawrence and Lorsch's observation that firms operating in more complex environments need more elaborate integrative mechanisms [Ref. 10]. Second, they expressed a stronger concern for developing budgets that could be safely obtained, which can be interpreted as an attempt to reduce the perceived uncertainty.

The similarities reported between the apparel and the aerospace industries are not surprising. They are consistent with Fiedler's findings that a more authoritarian and task-oriented leadership style may be the most effective for highly programmable and structured tasks, as well as for other extremes, i.e. unprogrammable, and ambiguous tasks.

Fiedler explained the latter by a need to reduce the level of uncertainty so that an organization can operate effectively [Ref. 11]. On a large number of items, however, the aerospace industry could not be distinguished from the wood and the chemical industries. Furthermore, these two industries, representing respectively Duncan's cells two and three, also could not be easily distinguished from each other. Further analysis is needed on the data to see if patterns may be distinguished.

Overall, however, the data supported what this research set out to do, that is, it clearly showed that firms in different economic and technical environments do adapt their budgetary processes to the nature of their respective environments, and therefore it supports the contingency theory of budgetary systems in different industries.

APPENDIX A

Factors and Components Comprising the Organizational Internal and External Environment

Internal Environment

1. Organizational Personnel Component
 - A. Educational and technological background and skills,
 - B. Previous technological and managerial skill,
 - C. Individual member's involvement and commitment to attaining system's goals,
 - D. Interpersonal behavior styles,
 - E. Availability of manpower for utilization within the system,
2. Organizational Functional and Staff Units Component
 - A. Technological characteristics of organizational units,
 - B. Interdependence of organizational units in carrying out their objectives,
 - C. Intra-unit conflict among organizational functional and staff units,
 - D. Inter-unit conflict among organizational functional and staff units,
3. Organizational Level Component
 - A. Organizational objectives and goals,
 - B. Integrative process integrating individuals and groups into contributing maximally to attaining organizational goals,
 - C. Nature of the organization's product services.

External Environment

4. Customer Component
 - A. Distribution of product or services
 - B. Actual users of product or service,
5. Suppliers Component
 - A. New materials suppliers,
 - B. Equipment suppliers,
 - C. Product parts suppliers,
 - D. Labor supply,
6. Competitor Component
 - A. Competitors for suppliers,
 - B. Competitors for customers,

7. Socio-political Component,
 - A. Government regulatory control over the industry,
 - B. Public political attitude towards industry and its particular product,
 - C. Relationships with trade unions with jurisdiction in the organization,
 8. Technological Component
 - A. Meeting new technological requirements of own industry and related industries in production of product or services,
 - B. Improving and developing new products by implementing new technological advances in the industry.
-
-

APPENDIX B

Environmental State Dimensions and Predicted Perceived Uncertainty Experienced by Individuals in Decision Units

Simple	Complex
<u>Cell 1</u> low perceived uncertainty	<u>Cell 2</u> moderately low perceived uncertainty

Static	
1) Small number of factors and components in the environment	1) Large number of factors and components in the environment
2) Factors and components are somewhat similar to one another	2) Factors and components are not similar to one another
3) Factors and components remain basically the same and are not changing	3) Factors and components remain basically the same
<u>Cell 3</u> moderately high perceived	<u>Cell 4</u> high perceived uncertainty

Dynamic	
1) Small number of factors and components in the environment	1) Large number of factors and components in the environment
2) Factors and components are somewhat similar to one another	2) Factors and components are not similar to one another
3) Factors and components of the environment are in continual process of change	3) Factors and components of environment are in a continual process of change

APPENDIX C

Factor Loadings of Budget-Related Behavior Items (from Merchant's Research)

FCTR	Title and Items Loading > .40	Ldng	% of var.
1	REQUIRED EXPLANATIONS OF VARIANCES		42.6
	I am required to submit an explanation in writing about causes of large budget variances	.77	
	I am required to report actions I take to correct causes of budget variances.....	.73	
	I am required to prepare reports comparing actual results with budget.....	.66	
	I am required to trace the cause of budget variances to groups or individuals within my department.....	.66	
2	INFLUENCE ON BUDGET PLANS		13.4
	The budget is finalized only when I am satisfied with it.....	.67	
	New budgets include changes I have suggested..	.66	
3	INTERACTIONS WITH SUBORDINATES		8.8
	I discuss budget items with my subordinates when problems occur.....	.67	
	I work with my subordinates in preparing the budget for my department.....	.57	
	I evaluate my subordinates by means of the budget.....	.53	
4	REACTIONS TO EXPECTED BUDGET OVERRUNS		6.3
	I find it necessary to charge some activities to other accounts when budgeted funds for these activities have been used up.....	.91	
	I have to shift figures relating to operations to reduce budget variances.....	.76	
	I find it necessary to stop some activities in my department when budgeted funds are used up.	.41	
5	INTERACTIONS WITH SUPERIORS		5.5
	I work with my superior in preparing the budget for my department.....	.53	
	I am consulted by my superiors about special factors I would like to have included in the budget being prepared.....	.51	
	I go to my superior for advice on how to achieve my budget.....	.50	

6	PERSONAL INVOLVEMENT IN BUDGETING		4.7
	I investigate favorable as well as unfavorable variances for my department.....	.52	
	Preparing the budget for my department requires my attending to a great number of details.....	.52	
	I personally investigate budget variances in my department.....	.47	

Merchant, K. A., The Design of the Corporate Budgeting System: Influences on Management Behavior and Performance, The Account Review, October, 1981.

APPENDIX D
Factors and Variables of Budget-Related
Behavioral Items (Current Study)

Title and Items Loading > .40	Ldng	% of Var
1. Required Explanations of Variances		.24
I am required to prepare reports comparing actual results with budget.....	.85	
I am required to submit an explanation in writing about causes of large budget variances.....	.87	
I am required to trace the cause of budget variances to groups or individuals within my department.....	.72	
I am required to report actions I take to correct causes of budget variances.....	.78	
2. Interactions with superiors		.11
I work with my superior in preparing the budget for my department.....	.84	
I am consulted by my superiors about special factors I would like to have included in the budget being prepared.....	.83	
I go to my supervisor for advise on how to achieve my budget.....	.59	
3. Personal Involvement in Budgeting		.09
Preparing the budget for my department requires my attending to a great number of details.....	.52	
I investigate favorable as well as unfavorable variances for my department.....	.62	
I personally investigate budget variances in my department.....	.81	
I discuss budget items with my subordinates when problems occur.....	.51	
4. Reactions to Budget Overruns		.09
I find it necessary to charge some activities to other accounts when budgeted funds for these activities have been used up.....	.89	
I have to shift figures relating to operations to reduce budget variances.....	.89	

5. Interactions With Subordinates		.07
I work with my subordinates in preparing the budget for my department.....	.92	
I evaluate my subordinates by means of the budget	.41	
6. Influence On Budget Plans		.05
New budgets include changes I have suggested.....	.75	
The budget is finalized only when I am satisfied with it.....	.61	
I find it necessary to stop some activities in my department when budgeted funds are used up.....	.41	

- * Ldng = Loading
% of Var = Percentage of Variance

APPENDIX E

Factor Loadings of Motivational and Attitudinal Items (Current Study)

Title and Items Loading >.40	* Ldng	% of Var.
1. Link With the Corporate Reward System		.27
Budget performance is an important factor in advancing my career.....	.55	
Meeting the budgeted goals consistently will improve a manager's job security.....	.83	
Exceeding budgeted performance will lead to more responsibility.....	.70	
Good budget performance is a prerequisite to advancement.....	.69	
Pay increases are closely tied into budget performance.....	.68	
My talents will be better recognized if my department attains the budget.....	.55	
I will have better relations with my supervisor if my department performs well in relation to the budget.....	.47	
2. Intrinsic Motivation and Attitudes		.09
Good performance relative to budgeted levels gives me a feeling of accomplishment.....	.62	
The budget enables me to be a better manager.....	.40	
Managing to achieve budgeted levels contributes to my personal growth and development.....	.57	
I get a great sense of personal satisfaction when my department's performance compares favorably with the budget.....	.94	
The budget enables me to keep track of my success as a manager.....	.67	
3. Slack in the Budget		.06
Top management receives detailed information on the activities of my department.....	.60	
My supervisor has enough information to know if there is slack in my budget.....	.88	
Top management has a way to know if there is slack in a departmental budget.....	.81	

4. Ability To Manipulate the Budgetary Process		.06
To protect himself, a manager submits budgets that can be safely attained.....	.72	
In good business times, my supervisor is willing to accept a reasonable level of slack in my budget	.81	
With some skill, a manager can make his performance look just as he wants.....	.45	
5. Usefulness of Budgeting		.05
If I am having trouble meeting the budget, the controller can often help me out.....	.56	
The budgeting system assists my department's efforts to improve methods of production.....	.51	
The budget encourages me to be more innovative....	.40	
The budget enables me to be more flexible.....	.76	
6. The Budget Game		.05
It is sometimes necessary to make expenditures which might otherwise not be made so as to avoid budget reductions in the next period.....	.66	
To be safe, a manager usually sets two levels of standards; one between himself and his boss, and another between himself and his subordinates.....	.58	
Slack in the budget is good to do things that can not be officially approved.....	.61	

* Ldng = Loading

% of Var.= Percentage of Variance

APPENDIX F

ANALYSIS OF VARIANCE, BUDGET-RELATED "BEHAVIORAL ITEMS" (current study)

Title and Items (.05 cut-off)	F Value	Prob >F	Industry Mean Responses			
			I	II	III	IV

1. Required Explanations of Variances	3.92	.01				

I am required to prepare re- ports comparing actual re- sults with budget.....	3.11	.03	1.78	2.34	2.44	1.86
I am required to submit an explanation in writing about causes of large budget variances.....	6.16	.0006	1.84	3.03	2.76	2.51
I am required to trace the cause of budget variances to groups or individuals within my department.....	5.78	.001	2.00	2.97	2.91	2.40
I am required to report actions I take to correct causes of budget variances..	6.53	.0004	2.24	2.83	2.98	2.21

2. Interactions With Superiors	2.52	.05				

I go to my supervisor for advice on how to achieve my budget.....	4.41	.005	3.00	3.41	2.71	2.37

3. Personal Involvement in Budgeting	4.77	.005				

Preparing the budget for my department requires my attending to a great number of details.....	5.17	.002	1.59	2.28	2.48	2.37
I investigate favorable as well as unfavorable variances for my department.	3.20	.02	1.30	1.86	1.77	1.62

4. Reactions to Budget

Overruns 3.15 .05

 I find it necessary to
 charge some activities to
 other accounts when
 budgeted funds for these
 activities have been
 used up.....6.77 .0003 4.16 3.93 3.97 4.58

5. Interactions with

Subordinates NA NA

 I evaluate my subordinates
 by means of the budget.....2.87 .04 2.32 2.45 2.86 2.48

6. Influence on Budget

Plans 4.79 .005

 NA NA

APPENDIX G

ANALYSIS OF VARIANCE, MOTIVATIONAL AND ATTITUDINAL ITEMS (current study)

Title and Items (.05 cut-off)	F value	Prob >F	Industry Mean Responses			
			I	II	III	IV
1. Link with the Corporate reward system	2.12	.003				
Budget performance is in important factor in ad- vancing my career.....	4.26	.006	4.09	3.66	3.43	3.70
Meeting the Budgeted goals consistently will improve a manager's job security.....	2.61	.05	3.60	3.55	3.21	3.36
Exceeding budgeted per- formances will lead to more responsibility.....	4.90	.003	3.00	3.00	2.88	2.57
Pay increases are closely tied into budget performance..	3.81	.01	3.29	3.17	2.67	2.86
My talents will be better recognized if my department attains the budget.....	2.93	.04	3.71	3.48	3.22	3.39
2. Intrinsic Motivation and Attitudes.....	1.93	.02				
Good performance relative to budgeted levels gives me a feeling of accomplishment.....	3.62	.01	4.37	4.00	3.93	4.18
The budget enables me to be a better manager.....	2.73	.04	4.29	3.93	3.87	3.91
I get a great sense of per- sonal satisfaction when my department's performance compares favorably with the budget.....	5.74	.001	4.23	3.76	3.70	4.09
3. Slack in the Budget	4.32	.01				
Top management receives de- tailed information on the activities of my department...	5.70	.001	4.06	3.69	3.25	3.45
Top management has a way to know if there is slack in a department budget.....	3.19	.03	3.74	3.21	3.21	3.30

4. Ability to Manipulate the Budgetary Process	4.55	.009				

To protect himself, a manager submits budgets that can be safely attained.....	2.74	.04	2.22	2.52	2.58	2.82
In good business times, my supervisor is willing to accept a reasonable level of slack in my budget.....	2.96	.03	2.74	2.55	3.09	2.75
With some skill, a manager can make his performance look just as he wants.....	3.81	.01	2.14	2.31	2.63	2.59

5. Usefulness of Budgeting	2.77	.05				

The budget encourages me to be more innovative.....	2.78	.04	3.57	3.41	3.09	3.52

6. The Budgeting Game	3.40	.02				

LIST OF REFERENCES

1. Lawrence, P. R. and Lorsch, J. W., Organization and Environment, Harvard University, 1967.
2. Burns, T. and Stalker, G. M., The Management of Innovation, Tavistock Publications Ltd., London, 1971.
3. Woodward, J., Management and Technology, HMSO, Gt. Britain Ministry Of Technology, 1958, p. 10.
4. Burns, T. and Stalker, G. M., The Management of Innovation, Tavistock Publications Ltd., London, 1971, pp. 5 and 6.
5. Merchant, K. A., The Design of the Corporate Budgeting System: Influences on Management Behavior and Performance, The Accounting Review, October, 1981.
6. Duncan, R. E., Characteristics of Organizational Environments and Perceived Environmental Uncertainty, Administrative Science Quarterly, Volume 17, Number 3, September 1972, pp.314-317.
7. Swieringa, R. J. and Moncur, R. H., Some Effects of Participation of Participative Budgeting on Managerial Behavior, National Association of Accountants, 1975.
8. Bruns, W. J., Jr., and Waterhouse, J. H., Budgetary Control and Organizational Structure, Journal of Accounting Research, Autumn 1975, pp.177-203.
9. Hackman, J. R. and Porter, L. W., Expectancy Theory Predictions of Work Effectiveness, Organizational Behavior and Human Performance, November, 1968, pp417-426.
10. Lawrence, P. R. and Lorsch, J. W., Organization and Environment, Harvard University, 1967.
11. Fiedler, F. E., A Theory of Leadership Effectiveness, McGraw Hill, New York 1967.

INITIAL DISTRIBUTION LIST

		No. Copies
1.	Defense Technical Information Center Cameron Station Alexandria, Virginia 22314	2
2.	Library, code 0142 Naval Post Graduate School Monterey, California 93943	2
3.	Dr. Maria Solange Perret, code 54Pi Department of Administrative Sciences Naval Postgraduate School Monterey, California 93943	1
4.	Dr. Joseph G. San Miguel, code 54Zp Department of Administrative Sciences Naval Post Graduate School Monterey, California 93943	1
5.	Dr. Bruce Bloxom, code 54Xo Department of Administrative Sciences Naval Post Graduate School Monterey, California 93943	1
6.	Dr. William E. McGarvey, code 54Ms Department of Administrative Sciences Naval Post Graduate School Monterey, California 93943	1
7.	Lieutenant M.S. Roesner 2016 Inca Ct. Virginia Beach, Virginia 23456	1
8.	Lt.Col. Joseph F. Mullane, Jr., code 54Mm Department of Administrative Sciences Naval Post Graduate School Monterey, California 93943	1

END

FILMED

5-84

DTIC